

Mathematical Methods in the Applied Sciences

Editorial Board

Editor Emeritus

B. Brosowski, Frankfurt, Germany

Managing Editors

G. F. Roach
Department of Mathematics
University of Strathclyde
Glasgow G1 1XH
Scotland, UK

W. Spröbig
Freiberg University of Mining
and Technology,
Department of Mathematics
and Computer Sciences,
Bernhard-von-Cotta Strasse 2,
D-09596 Freiberg, Germany

Associate Editor

A. McBride, Glasgow

Advisory Editors

H.-D. Alber, Darmstadt
W. Allegretto, Edmonton
A. Bellini-Morante, Firenze
P. Colli, Pavia
W. Eckhaus, Utrecht
H. Fujita, Kawasaki
R. P. Gilbert, Newark, DE
K. P. Hadeler, Tübingen
P. Hagedorn, Darmstadt
K.-H. Hoffmann, München
G. C. Hsiao, Newark, DE
E. M. de Jager, Amsterdam
D. S. Jones, Dundee
B. L. Keyfitz, Houston
H.-O. Kreiss, Uppsala
R. Kress, Göttingen

R. Leis, Bonn
H. A. Levine, Ames, IA
V. Lvov, Charkov
E. Meister, Darmstadt
J. C. Nedelec, Paris
H. Neunzert, Kaiserslautern
L. E. Payne, Ithaca, NY
A. Piskorek, Warszawa
R. Racke, Konstanz
M. Renardy, Blacksburg, VA
E. Sanchez-Palencia, Paris
Y. Shibata, Tokyo
B. Straughan, Durham
F. Ursell, Manchester
W. Wendland, Stuttgart
P. Werner, Stuttgart



WILEY

Publishers Since 1807



B. G. Teubner

MMSCDB 23 1-1674 (2000)

ISSN 0170-4214

Mathematical Methods in the Applied Sciences

This journal is concerned with those mathematical methods which are evidently necessary for the further understanding and thorough analysis of actual problems in the applied sciences. Manuscripts which are either concerned mainly with numerical processes or contain only the application of well established methods, or do not result from specific problems in the applied sciences will not be accepted for publication.

Subscriptions

Mathematical Methods in the Applied Sciences (Print ISSN 0170-4214; Online ISSN 1099-1476 at Wiley InterScience, www.interscience.wiley.com) is published monthly plus six additional issues in January, March, May, July, September and November (total 18 issues) by John Wiley & Sons, Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD, UK and B. G. Teubner, Industriest. 15, Postfach 801069, D-7000 Stuttgart 80, Germany.

Subscription Rates

Volume 23 2000 18 issues
Institutional US \$2610.00

Prices for individuals are available on request. To subscribe, please contact Journals Subscription Department, John Wiley & Sons, Ltd., 1 Oldlands Way, Bognor Regis, West Sussex PO22 9SA, UK.
Tel: +44 (0)1243 779777
Fax: +44 (0)1243 843232
e-mail: cs-journals@wiley.co.uk

Sample Copies

If you are interested in subscribing, you may obtain a free sample copy by contacting John Wiley & Sons, Ltd. at the above address.

Services

Advertisements and Bulk Reprints

For companies based outside North America contact: Advertisement Sales Department, John Wiley & Sons, Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD, UK.
Tel: +44 (0)1243 770351
Fax: +44 (0)1243 770432
e-mail: adsales@wiley.co.uk

or

For companies based in North America contact: Advertisement Sales Department, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, USA.
Tel: +1 212 850 8832
Fax: +1 212 850 6207
e-mail: kmarion@wiley.com

General Enquiries

Tel: +44 (0) 1243 779777
Fax: +44 (0) 1243 775878

Copyright

Copyright © 2000 John Wiley & Sons, Ltd.
All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as described below, without the permission in writing of the Publisher.

Copying of articles is not permitted except for personal and internal use, to the extent permitted by national copyright law, or under the terms of a licence issued by the national Reproduction Rights Organization (such as Copyright Licensing Agency, 90 Tottenham Court Road, London W1P 9HE, UK or Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970, USA). The price is \$30 per copy. Requests for permission for other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale, and other enquiries should be addressed to the Publisher.

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinions of John Wiley & Sons, Ltd. Wiley assumes no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. Wiley expressly disclaims any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

Abstracting and Indexing

Mathematical Methods in the Applied Science is covered by the following abstracting and indexing services: 'Applied Mechanics Reviews', 'CompuMath Citation Index' (ISI), 'Current Contents'/Physical, Chemical & Earth Sciences' (ISI), 'Ei COMPENDEX PLUS', 'Ei Page One', 'INSPEC', 'ISI Alerting Services', 'Mathematical Reviews', 'Science Citation Index Expanded' (also known as SciSearch®) (ISI), 'VINITI' (Russian Academy of Sciences), 'Zentralblatt für Mathematik/Mathematics Abstracts'.

Production Information

Production Department Contact

e-mail: pwright@wiley.co.uk

Production Details

Printed on acid-free paper.
Typeset by Macmillan India Ltd., Bangalore, India.
Printed and bound in Great Britain by Henry Ling Ltd., The Dorset Press, Dorchester.

Identification Statement

Mathematical Methods in the Applied Sciences (ISSN 0170-4214/USPS 002-508) is published monthly plus six additional issues in January, March, May, July, September and November (total 18 issues) by John Wiley & Sons, Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD, UK and B. G. Teubner, Industriest. 15, Postfach 801069, D-7000 Stuttgart 80, Germany. Periodicals postage paid at Rahway, NJ. Air freight and mailing in the USA by Mercury Airfreight International Ltd. Inc., 365 Blair Road, Avenel, NJ 07001, USA
USA Postmaster—send address changes to *Mathematical Methods in the Applied Sciences*, c/o Mercury Airfreight International Ltd. Inc., 365 Blair Road, Avenel, NJ 07001, USA.

CONTENTS

VOLUME 23, Nos 1-18

Issue No. 1, 10 January 2000

Implicit Operator Differential Equations and Applications to Electrodynamics: A. Rutkas and L. Vlasenko.....	1
On Thermodynamic Conditions for the Stability of a Thermoelectromagnetic System: G. Amendola	17
Exponential Decay of Non-linear Wave Equation with a Viscoelastic Boundary Condition: J. E. Muñoz Rivera and D. Andrade.....	41
Generalized Broadwell Models for the Discrete Boltzmann Equation with Linear and Quadratic Terms: M. Yamazaki.....	63
Properties of Poisson Kernel for a Degenerate Elliptic Equation: X. Ji and T. Qian	71
Elliptic Boundary Value Problems of Fluid Dynamics over Unbounded Domains: P. Cerejeiras and U. Kähler.....	81

Issue No. 2, 25 January 2000

An Inverse Boundary Value Problem for the Oseen Equation: R. Kress and S. Meyer	103
Inelastic Scattering Models in Transport Theory and their Small Mean Free Path Analysis: J. Banasiak, G. Frosali and G. Spiga	121
On the Motion of a Vortex Ring with a Sharply Concentrated Vorticity: D. Benedetto, E. Caglioti and C. Marchioro	147
Tensorial Properties of Multiple View Constraints: A. Heyden.....	169

Issue No. 3, February 2000

On the Rate of Decay of Solutions to Linear Viscoelastic Equation: Y. Shibata	203
Piecewise Optimal Distributed Controls for 2D Boussinesq Equations: H.-C. Lee and B. C. Shin.....	227

iv Volume Contents

Isoperimetric Inequalities for the Energy of Uniform-vorticity Flows in Channels of Uniform Width: A. Acker	255
On Quasi-local Inversion of Spiral CT Data: A. Katsevich	271

Issue No. 4, 10 March 2000

Weak Solutions for Falk's Model of Shape Memory Alloys: T. Aiki.....	299
Asymptotic Analysis of a Spectral Problem in a Periodic Thick Junction of Type 3:2:1: T. A. Mel'nyk	321
Persistence of Two Prey-One Predator System with Ratio-dependent Predator Influence: D. Kesh, A. K. Sarkar and A. B. Roy	347
A Three-dimensional Finite Element Model for the Control of Certain Non-linear Bioreactors: J. Tervo, M. Vauhkonen, P. J. Vauhkonen and J. P. Kaipio	357
Sensitivity Phenomena for Certain Thin Elastic Shells with Edges: P. Gerard and E. Sanchez-Palencia.....	379

Issue No. 5, 25 March 2000

The Coupling of Hyperbolic and Elliptic Boundary Value Problems with Variable Coefficients: C. A. Coclici, G. Moroşanu and W. L. Wendland ..	401
Boundary Integral Method for Thermoelastic Screen Scattering Problem in \mathbb{R}^3 : F. Cakoni	441
Second-order Finite-volume Schemes for a Non-linear Hyperbolic Equation: Error Estimate: C. Chainais-Hillairet.....	467

Issue No. 6, April 2000

Existence of Solutions to a Phase-field Model for the Isothermal Solidification Process of a Binary Alloy: J. Rappaz and J. F. Scheid	491
Derivatives of the Energy Functional for 2D-problems with a Crack under Signorini and Friction Conditions: M. Bach, A. M. Khludnev and V. A. Kovtunenکو.....	515
Global Existence, Asymptotic Behaviour, and Global Non-existence of Solutions for Damped Non-linear Wave Equations of Kirchhoff Type in the Whole Space: K. Ono.....	535
A Cauchy Inequality for the Boltzmann Equation: A. Nouri	561
Weak Solutions for the Exterior Stokes Problem in Weighted Sobolev Spaces: F. Alliot and C. Amrouche	575

Issue No. 7, 10 May 2000

Vlasov Equation with Nonhomogeneous Boundary Conditions: S. Mancini and S. Totaro.....	601
--	-----

Existence and Non-existence of Global Solutions for a Class of Non-linear Wave Equations: C. Guowang and Y. Zhijian	615
Attractors for a Damped Wave Equation on \mathbb{R}^3 with Linear Memory: V. Pata	633
Asymptotic Analysis and Boundary Homogenization in Linear Elasticity: M. El Jarroudi, A. Addou and A. Brillard	655

Issue No. 8, 25 May 2000

Study of Generalized Eigenfunctions of a Perturbed Isotropic Elastic Half-space: Y. Dermenjian and P. Gaitan.	685
A New Active Contour Model for Shape Extraction: D. Ravi	709
Limit Behaviour of Solutions to Equivalued Surface Boundary Value Problem for p -Laplacian Equations: Li Fengquan.	723
A Boundary Value Problem for a Kinetic Model Describing Electron Flow in a Semiconductor: C. R. Drago and A. Majorana	735
Blow up for a Class of Quasilinear Wave Equations in One Space Dimension: Y. Martel.	751

Issue No. 9, June 2000

New Exact Solutions of the Massive Dirac Equation with Electric or Scalar Potential: V. V. Kravchenko and M. P. Ramírez.	769
Convergence of a Dual-porosity Model for Two-phase Flow in Fractured Reservoirs: L.-M. Yeh	777
Variational Formulations for Vlasov-Poisson-Fokker-Planck Systems: C. Huang and R. Jordan	803

Issue No. 10, 10 July 2000

An Approach to Solutions of Coupled Semilinear Partial Differential Equations with Applications: H. I. Abdel-Gawad and A. M. El-Shrae ...	845
Contact Problems of Hyperelastic Membranes: Existence Theory: H. Andrä, M. K. Warby and J. R. Whiteman	865
An Elliptic Quasi-variational Inequality with Gradient Constraints and some Applications: M. Kunze and J. F. Rodrigues	897
Hysteresis in Phase-field Models with Thermal Memory: G. Gilardi, P. Krejčí and J. Sprekels	909
L^∞ -estimates for the Vlasov-Poisson-Planck Equation: M. Pulvirenti and C. Simeoni	923
Implicit Linear Time-dependent Differential-difference Equations and Applications: L. Vlasenko	937

Issue No. 11, 25 July 2000

Structure of Flood Wave with Viscosity: H. Sixun and Z. Jiaozhi	949
<i>A Priori</i> Estimates for Very Fast Diffusion Equations in \mathbb{R}^n : G. Bernard ..	965
Shape Analysis in Membrane Vibration: J. Cagnol and J.-P. Zolesio	985
Non-homogeneous Boundary Value Problem for the Chan–Bodner– Linhholm model: P. Gwiazda	1011

Issue No. 12, August 2000

On a Free Boundary Problem in Ground Freezing: G. Łukaszewicz and W. Sadowski	1023
Sharp Stability Estimates of Harmonic Continuation Along Lines: G. Alessandrini and A. Favaron	1037
An Integral Equation Method for the Electromagnetic Scattering from Cavities: H. Ammari, G. Bao and A. W. Wood	1057
Numerical Solution of Diffraction Problems by a Least-squares Finite Element Method: G. Bao, Y. Cao and H. Yang	1073
Linearized Quantum and Relativistic Fokker–Planck–Landau Equations: M. Lemou	1093

Issue No. 13, 10 September 2000

Approximate Biflow Solutions of the Kinetic Bryan–Pidduck Equation: V. D. Gordevsky	1121
Existence and Uniqueness of Elliptic Periodic Solutions of the Brillouin Electron Beam Focusing System: P. J. Torres	1139
Integral Equation Methods in Electromagnetic Scattering from Anisotropic Media: R. Potthast	1145
Asymptotic Behaviour of a Non-classical Heat Conduction Problem for a Semi-infinite Material: L. R. Berrone, D. A. Tarzia and L. T. Villa	1161
Stability of Equilibria in a Neural Network Model: E. Barone and C. Tebaldi	1179

Issue No. 14, 25 September 2000

Periodic Solutions of the 1D Vlasov–Maxwell System with Boundary Conditions: M. Bostan and F. Poupaud	1195
Travelling Waves in Lattice Dynamical Systems: A. A. Pankov and K. Pflüger	1223
On a Diffusion–Kinetic Equation Arising in Extended Kinetic Theory: J. Banasiak	1237
Guided Waves in a Stratified Elastic and Locally Perturbed Domain: Theoretical and Numerical Aspects: M. Cristofol	1257

Issue No. 15, October 2000

Nonstationary Iterated Tikhonov–Morozov Method and Third-order Differential Equations for the Evaluation of Unbounded Operators: C. W. Groetsch and O. Scherzer	1287
On the Singular Limit of a Model Transport Semigroup: M. Mokhtar-Kharroubi, V. Protopopescu and L. Thevenot	1301
On the Blow-up Rate for the Heat Equation with a Non-linear Boundary Condition: M. Chlebik and M. Fila	1323
Non-linear Bone Remodelling: An Existence and Uniqueness Result: L. Trabucho	1331
A Variational Approach to Transonic Potential Flow Problems: H. P. Gittel	1347
Approximate Inverse Meets Local Tomography: A. Rieder, R. Dietz and T. Schuster	1373

Issue No. 16, 10 November 2000

Relationship Between the Lower Frequency Spectrum of Plates and Networks of Beams: S. Nicaise and O. Perkin	1389
On the Neumann Problem for the Helmholtz Equation in a Plane Angle: P. Zhevandrov and A. Merzon	1401
Global Stability in the Bénard Problem for a Mixture with Superimposed Plane Parallel Shear Flows: S. Lombardo, G. Mulone and S. Rionero	1447
Stationary Patterns to Diffusion Problems: J. García-Melián and J. Sabina de Lis	1467

Issue No. 17, 25 November 2000

Non-linear Systems in Plankton Population Dynamics and Nitrogen Cycles: H. Morimoto	1491
On Surface Waves in Diffraction Gratings: V. E. Grikurov, M. A. Lyalinov, P. Neittaanmäki and B. A. Plamenevskii.	1513
Continuous Dependence on Modelling and Non-existence Results for a Ginzburg–Landau Equation: K. A. Ames	1537
A Local Boundary Condition Coupled to a Finite Element Method to Compute Guided Modes of Optical Fibres under the Weak Guidance Assumptions: R. Djellouli, C. Bekkey, A. Choutri and H. Rezgui	1551

Issue No. 18, December 2000

Riesz Basis Property of Root Vectors of Non-self-adjoint Operators Generated by Aircraft Wing Model in Subsonic Airflow: M. A. Shubov. .	1585
--	------

viii Volume Contents

On Two-dimensional Unsteady Incompressible Fluid Flow in an Infinite Strip: Guo Ben-yu and Xu Cheng-long	1617
Concentrated Force Acting in an Inviscid and Incompressible Parallel Flow: J. A. Sparenberg and E. M. de Jager	1637
On Weakly Convergent Sequences in Banach Function Spaces and the Initial-boundary Value Problems for Non-linear Klein-Gordon-Schrödinger Equations: Wang Baoxiang	1655
Exact Solitary Wave Solutions to a Combined KdV and mKdV Equation: Jun Yu	1667
AUTHOR INDEX	1671
KEY WORD INDEX	1673

